

COST OF CONSTRUCTING LOCKS AND DAMS IN ALLE-
GHENY RIVER, PENNSYLVANIA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT OF
REVISED ESTIMATE OF THE COST OF COMPLETING LOCKS AND
DAMS NOS. 1 AND 3 AND FOR CONSTRUCTING LOCK AND DAM
NO. 2 IN ALLEGHENY RIVER, PENNSYLVANIA.

FEBRUARY 7, 1902.—Referred to the Committee on Rivers and Harbors and ordered
to be printed.

WAR DEPARTMENT,
Washington, February 5, 1902.

SIR: I have the honor to transmit herewith, for the information of
the Committee on Rivers and Harbors, a letter from the Chief of
Engineers, United States Army, dated February 3 instant, submitting
a report dated January 21 ultimo, from Capt. W. L. Sibert, Corps of
Engineers, giving a revised estimate of the cost of completing Locks
and Dams Nos. 1 and 3 and for constructing Lock and Dam No. 2, all
in the Allegheny River, Pennsylvania.

Very respectfully,

ELIHU ROOT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, February 3, 1902.

SIR: I have the honor to submit herewith a report, dated the 21st
ultimo, from Capt. W. L. Sibert, Corps of Engineers, giving a revised
estimate of the cost of completing Locks and Dams Nos. 1 and 3 and
for constructing Lock and Dam No. 2, all in the Allegheny River,
Pennsylvania.

The construction of these locks and dams was provided for in the river and harbor act of June 3, 1896, the work to be prosecuted under the continuous-contract system. The limiting cost originally authorized by Congress was \$1,132,000.

The work on Locks and Dams Nos. 1 and 3 is now being carried on under contract. A contract for the construction of Lock and Dam No. 2 was entered into, but it was found necessary to annul the contract for the reason that it was impossible to obtain title to the necessary land at the location fixed by Congress.

For reasons clearly set forth in the report, Captain Sibert estimates that the cost of completing the three structures, including the cost of the necessary land for the site of Lock and Dam No. 2, should Congress authorize a change in the location thereof, will be \$178,732 greater than originally estimated, making the total cost of the improvement \$1,310,732.

I beg to recommend that the papers be transmitted to the Speaker of the House of Representatives for the information of the Committee on Rivers and Harbors.

Very respectfully, your obedient servant,

G. S. GILLESPIE,
Brig. Gen., Chief of Engineers, U. S. Army.

Hon. ELIHU ROOT,
Secretary of War.

REPORT OF CAPT. W. L. SIBERT, CORPS OF ENGINEERS.

ENGINEER OFFICE, UNITED STATES ARMY,
Pittsburg, Pa., January 21, 1902.

GENERAL: 1. I have the honor to submit herewith for your consideration a revised estimate of the cost of completing Locks and Dams Nos. 1 and 3 and for constructing Lock and Dam No. 2, all in the Allegheny River, Pennsylvania:

Lock and dam at—	Estimated cost of completion Jan. 1, 1902.	Amount expended to Jan. 1, 1902.	Total cost (partly estimated and partly actual expenditure).	Original estimate.
Herr Island (No. 1)	\$84,808.99	\$499,039.93	\$583,848.92	\$632,000.00
Six-mile Island (No. 2)	376,199.54	4,500.00	*380,699.54	250,000.00
Springdale (No. 3)	150,857.41	165,326.13	316,183.54	250,000.00
Total	611,865.94	668,866.06	1,280,732.00	1,132,000.00

* Exclusive of any further purchase of land.

The limiting cost for the above locks and dams as fixed by Congress is \$1,132,000. The present estimate of such cost is \$1,280,732. The difference, \$148,732, will be necessary to complete the work. No provision has been made for this. The detailed estimate on which the above estimate is based was made by Assistant Engineer J. W. Arras. A copy is inclosed.

2. The following are the reasons for the increase in estimate: Lock No. 3 was placed 35 feet farther out into the river than at first expected.

This involved an extra expenditure of \$24,063.72 for additional filling behind land wall of lock. The facilities of navigation were improved by this change. In preparing foundation for this lock it was found necessary to remove 8,101 cubic yards of hardpan that had been mistaken for solid rock not requiring removal, at a cost of \$3,364.27. This extra excavation necessitated an increase of 3,395 cubic yards of concrete in foundation costing \$14,191.10. The above character of foundation necessitated sinking a crib below the dam along the river wall of the lock at a cost of \$3,500. The additional concrete found necessary in the lock and appurtenances cost \$8,121.06, and the additional piling \$4,310, making a total increase over the expected cost of \$57,550.15. It is estimated that an expenditure of \$1,236.56 will be necessary in building a return crib at the lower end of lock and making the necessary fill for lock houses, making a total of \$58,786.71 of unexpected cost.

3. The remainder of the \$148,732, viz, \$89,945.30, is the amount that it is estimated Lock No. 2 will cost over and above that for which it was originally contracted, the original contract having been abrogated. This increase in estimate over original estimate is principally due to increase in market values in labor and material since 1897. For instance: In 1897 for such work oak lumber could be purchased for \$17 per M. feet B. M., to-day the price is \$25 to \$30; then hemlock could be had for \$10 to \$12, now \$16 to \$18; iron bolts were worth about \$1 in 1897, now \$1.50 or more; and other materials have enhanced in value proportionately, Portland cement being one of the few articles which can be had for less money to-day than five years ago. Along with materials the cost of labor has also increased, and the same grade of labor which could then be had for \$1.50 is now dictating its terms at \$1.75 and \$2.

4. There is also another factor which tends to incline contract prices upward for such work in this locality. Practically all of the contractors who secured river contracts in this district prior to one year ago underestimated the conditions under which they had to operate and, as a result, either lost money heavily or failed entirely in completing their works. Both of the contractors who built the movable dam at Herr Island lost considerable money and were compelled to call on their bondsmen for aid in order to finish. The first contractor on the Upper Monongahela River locks and dams lost money and threw up his contract after doing about 10 per cent of the work; and the contractors at Lock and Dam No. 3 on the Allegheny admit that they have already lost \$25,000 which they do not expect to recover. The same is true of some of the recent contractors on the Ohio River works. All of these things may be safely relied upon to cause an increase of from 30 to 40 per cent in the prices of river work over those in contracts made in 1897.

5. Cause of delay in constructing Lock and Dam No. 2: The law making appropriation for building Locks and Dams Nos. 2 and 3 (R. and H. act, June 3, 1896) locates Lock and Dam No. 2 above the head of Sixmile Island. The only practicable location for this lock, complying with the above condition, is on certain land belonging to the city of Pittsburg, Pa. This office has not yet been able to procure a title to this land. A change in the wording of the law referred to above, so as to read "in the vicinity of Sixmile Island" instead of "above the head of Sixmile Island," might enable this office to procure

4 LOCKS AND DAMS, ALLEGHENY RIVER, PENNSYLVANIA.

a site for Lock No. 2 and build it. The best alternate location developed so far will practically involve the destruction of Sixmile Island, which of course would necessitate its purchase. An option was obtained for the purchase of this island by Major Powell, Corps of Engineers, October 30, 1899. The price then set was \$15,570. The island contains about 15 acres of land and is low. It would not be safe to estimate its cost now at less than \$25,000. Property values are increasing rapidly. Should the law be changed so as to authorize this location, the cost of the purchase of the island and of ground for the abutment should be added to the increase of estimate already mentioned. The land for abutment would probably cost \$5,000, making total increase necessary \$178,732.

Very respectfully, your obedient servant,

WM. L. SIBERT,
Captain, Corps of Engineers.

Brig. Gen. G. L. GILLESPIE,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

ENGINEER OFFICE, U. S. ARMY,
CENTRAL DIVISION,
Cincinnati, Ohio, January 27, 1902.

1. Respectfully forwarded to the Chief of Engineers, United States Army.

2. The matters herein submitted for consideration appear to have been carefully studied by the district engineer, and indicate that a sum \$148,732 (or \$150,000 in round numbers) will be required for completing Locks and Dams Nos. 1 and 3, in the Allegheny River, and for constructing No. 2 (exclusive of purchase of land) over and above the limit of cost heretofore fixed by Congress; also, that the law respecting location of the latter be changed so as to read "in the vicinity of Six-mile Island" instead of *above* its head.

3. The reasons given for the increased estimate and for greater latitude as respects final location of Lock and Dam No. 2 are sound ones, in my opinion, and it is therefore recommended that this paper be transmitted to Congress with request for favorable consideration and action. The total increased cost implied by such action is estimated at \$178,732, making the whole final cost of the improvement \$1,310,000 in round numbers, instead of \$1,132,000, as originally estimated.

G. J. LYDECKER,
Colonel, Corps of Engineers,
Division Engineer, Central Division.

Estimate of cost of completing Locks and Dams Nos. 1 and 3 and constructing Lock and Dam No. 2, Allegheny River.

LOCK AND DAM AT HERR ISLAND (NO. 1).

Final estimate and retained percentage on W. W. Hegeman contract for building one-half of dam	\$8,151.94
Completion of Hingston & Pihl contract:	
2,000 cubic yards excavation, at 30 cents	\$600.00
135 cubic yards concrete, at \$5.67	765.45

Completion of Hingston & Pihl contract—Continued.

400 cubic yards large stone, at \$3.10	\$1, 240.00	
100 cubic yards riprap stone filling, at \$2.60	260.00	
465 square yards paving, at \$1.60	744.00	
20 piles, at \$6	120.00	
50,000 feet B. M. oak timber, at \$39	1, 950.00	
6,000 pounds driftbolts, at 3 cents	180.00	
100 days' pumping, at \$10	1,000.00	
Retain percentage on former estimates	5, 460.97	
		\$12, 320.42

Completing Thos. Marshall contract for building bear-trap gates:

Estimate No. 2 and retained percentage	480.73	
Finishing gates	36, 982.20	
		37, 462.93

Completing and erecting lock gates:

Oak lumber—		
W. E. Strack contract	621.54	
G. E. Martin contract	74.60	
Bumping and running plank	461.16	
Planing diagonal decking	30.00	
Labor completing and erecting gates and quoins	1, 500.00	
Completing lock walls at gate anchorages	200.00	
		2, 887.30

Maneuvering boat, machinery, equipment, etc

3, 200.00

Bear-trap piers and abutment:

Cover plates for recesses, 3,000 pounds, at 6 cents	\$180.00	
4 slide covers for culvert mouths, 2,000 pounds, at 6 cents	120.00	
4 screens for culvert mouths, 1,500 pounds, at 10 cents	150.00	
Propeller, shaft, motor, etc., 5,182 pounds, at 20 cents	1, 036.40	
Air compressor	500.00	
Sectors and pinions for valves, 6,000 pounds, at 4½ cents	270.00	
		2, 256.40

Lock completion:

Cover plates for recesses, 12,000 pounds, at 4 cents	480.00	
4 hand capstans for operating gates	200.00	
Gates, spars, etc.	150.00	
		830.00

Lock house

6, 000.00

Former estimate for hydraulic plant to operate lock, which is not essential to operating same at outstart:

Valve sectors and reach rods	\$750.00	
Hydraulic valve-operating jacks (2)	150.00	
Turbine, turbine valves, and screens	700.00	
Pump (turbine)	1, 200.00	
Hydraulic pipe and fittings	500.00	
Accumulator, filter, and tank	3, 500.00	
Steam hydraulic pump	400.00	
Installation of machinery	1, 500.00	
		8, 700.00

Engineering and superintendence

2, 000.00

Electric wiring and lights

1, 000.00

84, 808.99

LOCK AND DAM AT SPRINGDALE (NO. 3).

Retained percentage on former estimates	16, 561.14
Completing dam (Sloan, McIlvain & Ott Bros. contract):	

Hemlock timber, 397,400 feet B. M., at \$19.50	\$7, 749.30
Hemlock timber, 198,820 feet B. M., at \$27.50	5, 467.55
Hemlock sheeting, 42,859 feet B. M., at \$27.50	1, 178.62
Oak timber, 517,632 feet B. M., at \$30	15, 528.96
Oak timber, 206,090 feet B. M., at \$40	8, 243.60
Oak sheeting, 52,645 feet B. M., at \$28	1, 474.06
Oak sheeting, 9,515 feet B. M., at \$40	380.60
Drift bolts, 140, 965 pounds, at 1.7 cents	2, 396.41
Driftbolts, 73,024 pounds, at 3 cents	2, 190.72

6 LOCKS AND DAMS, ALLEGHENY RIVER, PENNSYLVANIA.

Completing dam (Sloan, McIlvain & Ott Bros. contract)—C't'd.	
Dredging, 1,240 cubic yards, at 16 cents.....	\$198. 40
Stone filling, 15,654 cubic yards, at \$1.07.....	16,749. 78
Gravel filling, 8,710 cubic yards, at 30 cents.....	2,613. 00
Large stone, 1,454 cubic yards, at \$2.25.....	3,271. 50
Gravel backing, 8,088 cubic yards, at 15 cents.....	1,213. 20
Oak piles, 780, at \$8.62.....	6,723. 60
Steel angle plate (not let), 47,000 pounds, at 3.5 cents....	1,645. 00
	<hr/> \$77,024. 30
Completing abutment (under contract):	
Sheet piling, 4,000 feet B. M., at \$44.....	176. 00
Concrete, core walls, 635 cubic yards, at \$5.57.....	3,536. 95
Concrete paving (15 inches), 370 cubic yards, at \$5.57....	2,060. 90
Stone paving, 860 square yards, at \$1.40.....	1,204. 00
Stone filling in cribs, 700 cubic yards, at \$1.....	700. 00
	<hr/> 7,677. 85
Completing lock (under contract):	
Grubbing and clearing.....	142. 00
Embankment, 4,887 cubic yards, at \$2.19.....	10,702. 53
Crib return wall, oak, 5,000 feet B. M., at \$44.....	220. 00
Crib return wall, hemlock, 6,000 feet B. M., at \$19.50....	117. 00
Crib return wall, driftbolts, 1,500 pounds, at 1.7 cents....	25. 50
Crib return wall, stone, 220 cubic yards, at \$1.....	220. 00
Paving of cribs, stone, 225 square yards, at \$1.10.....	247. 50
Lock gates, oak lumber, 55,000 feet B. M., at \$47.....	2,555. 00
Quoins and sills, oak lumber, 5,410 feet B. M., at \$60....	324. 60
	<hr/> 14,584. 13
Completing lock, etc. (not under contract):	
4 hand capstans for operating gates.....	200. 00
Valve-operating machinery (hand), cover plates for recesses, etc., 9,360 pounds.....	1,500. 00
Pile clusters and fenders above and below lock, embracing extra piles agreed to by Major Powell, 500 piles, at \$8.62.....	4,310. 00
Filling below lock, 2,000 cubic yards, at 25 cents.....	500. 00
Lock houses.....	6,000. 00
Filling about lock houses, 4,000 cubic yards, at 25 cents..	1,000. 00
Paving back of lock, 2,000 square yards, at \$1.50.....	3,000. 00
Dredging of channel below dam, 100,000 cubic yards.....	15,500. 00
	<hr/> 32,010. 00
Engineering and superintendence.....	3,000. 00
Total.....	<hr/> <hr/> 150,857. 42

APPROXIMATE ESTIMATE OF COST OF LOCK AND DAM AT SIXMILE ISLAND (No. 2).

Lock:	
Excavation, gravel, 9,800 cubic yards, at 30 cents.....	\$2,940. 00
Excavation, rock, 1,759 cubic yards, at \$3.....	5,277. 00
Concrete foundation, 2,722 cubic yards, at \$5.....	13,610. 00
Concrete lock walls, 11,650 cubic yards, at \$7.....	81,550. 00
Concrete lower (500 feet) guide wall, 2,000 cubic yards, at \$7.....	14,000. 00
Concrete upper (200 feet) guide wall, 1,400 cubic yards, at \$7.....	9,800. 00
Fill back of lock, 31,100 cubic yards, at 50 cents.....	15,550. 00
Fill for lock houses, 8,100 cubic yards, at 50 cents.....	4,050. 00
Paving back of lock, 2,000 cubic yards, at \$1.50.....	3,000. 00
Lock gates, pivots, quoins and sills, spars, etc.....	10,500. 00
Valves and operating machinery.....	4,500. 00
4 hand capstans for operating gates.....	200. 00
Lock houses.....	6,000. 00
	<hr/> \$170,977.00
Dam:	
Dredging, 45,000 cubic yards, at 30 cents.....	13,500. 00
Hemlock timber, 1,161,600 feet B. M., at \$30.....	34,848. 00
Hemlock sheeting, 69,300 feet B. M., at \$30.....	2,079. 00

Dam—Continued.

Oak timber, 1,071,040 feet B. M., at \$36.....	\$38,557.44	
Oak sheeting, 103,950 feet B. M., at \$40.....	4,158.00	
Driftbolts, 328,165 pounds, at 4 cents.....	13,126.60	
Stone filling, 24,350 cubic yards, at \$1.50.....	36,525.00	
Stone, large, 2,275 cubic yards, at \$2.50.....	5,687.50	
Gravel filling, 15,550 cubic yards, at 30 cents.....	4,665.00	
Gravel backing, 14,000 cubic yards, at 20 cents.....	2,800.00	
Steel angle plate, 64,700 pounds, at 4 cents.....	2,588.00	
		\$158,534.54

Abutment:

Oak for cribs, 38,000 feet B. M., at \$36.....	1,368.00	
Hemlocks for cribs, 100,000 feet B. M., at \$30.....	3,000.00	
Driftbolts, 18,000 pounds, at 4 cents.....	720.00	
Stone filling, 3,000 cubic yards, at \$1.50.....	4,500.00	
Concrete, cores, and paving, 800 cubic yards, at \$7.....	5,600.00	
Stone paving, 800 square yards, at \$1.50.....	1,200.00	
Embankment, 1,000 cubic yards, at 30 cents.....	300.00	
		16,688.00

Dredging approach to lock, 130,000 cubic yards.....	19,000.00
Engineering and superintendence.....	11,000.00

376,199.54

SUMMARY.

Completing Herr Island Lock and Dam:

Under contract.....	58,631.43
Not under contract.....	26,177.56

Completing Lock and Dam No. 3:

Under contract.....	118,512.42
Not under contract.....	32,345.00

Lock and Dam No. 2 (not under contract).....	376,199.54
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Total.....	611,865.95
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Total work under contract at Herr Island Dam and Lock and Dam No. 3.	177,143.85
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Respectfully submitted.

Your obedient servant,

J. W. ARRAS,
*Assistant Engineer.*Capt. WM. L. SIBERT,
Corps of Engineers, U. S. A.

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